TROUBLESHOOTING GUIDE



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SYSTEM FUNCTION

The Orbis consists of several key components. The function of these key components is described below.

Compressor


Compressor

The refrigerant in the compressor creates a cooling effect on the coolant in the tank when the compressor is running. For a 230v Orbis the current drawn by the compressor should be approximately 1.5A. This value will be double for a 110v compressor. The compressor is hermetically sealed and is intended to be maintenance free.

Pump


Pump

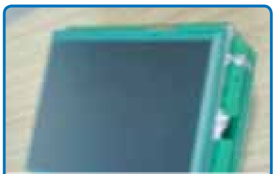
The pump circulates coolant from the tank to the cap. It can either be a single stage pump (one impellor) for the Orbis I or a two stage pump (two impellors) for the Orbis II. A healthy pump will typically draw approximately 0.5A of current at 230v. Double this for 110V. The pump is attached to the tank lid and should be exchanged as a complete item.

Fan and Condenser Assembly


Fan

The fan draws air over the condenser whilst the compressor is running. The air is drawn in through the back of the Orbis and therefore there must be no obstructions. The temperature of the air drawn in should be lower than 300°C therefore the back of the Orbis should not be facing any kind of heater or radiator, neither should the back be facing direct sunlight. The condenser should be kept clean so that the air has good contact with the fin arrangement. The fan will typically draw 0.25A of current (0.5A for 110v) whilst the compressor is on.

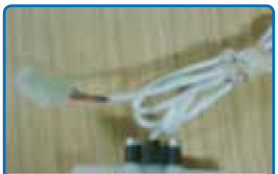
Controller and Touchscreen


Touchscreen


Controller

The controller supplies the power to the compressor, the fan and the pump. Temperature and coolant flow rate readings are inputs to the controller. Use only a dry cloth to clean the screen. The screen should not come into contact with water. Do not use sharp objects on the touchscreen and only light pressure is required.

Turbine


Turbine

The turbine is positioned in the coolant line and measures the coolant flow rate. A pulse with a frequency related to the flow rate of the coolant is transmitted to the controller. Push fittings are used to connect the turbine to the coolant lines.

Switches and Fuses


Switches & Fuses

The two on/off switches are positioned at the back of the Orbis. One is for the mains power and the other is for the pump. They light up when they are switched on. The 10 amp fuses are position inside the Orbis and are labelled 1 to 5.

SERVICE CHECKLIST

Model Type	ORBIS I ☐	ORBIS II ☐	PSC 1 ☐	PSC 2 ☐	Serial No:

Cap Reference Numbers	Small	Medium	Large

Hospital/Centre: ______________________________

					Tick	Initials
1	Check parameters on controllers					
2	Check for wear and tear on all caps and covers					
3	Check coolant lines and repair where necessary					
4	Clean condenser					
5	Check appropriate alarm					
6	Flush out tank and caps					
7	Fill with new Coolant					
8	Charge caps					
9	Time unit pull down after last cap has been charged					
9a	Air temp		Product temp		Time	
10	Clean exterior of unit					
11	Coolant colour and type		Sight glass type:,long/short		Software version:	
12	Carry out MPat electrical test. Initial, date and attach new label.					
13	Worksheet to sign and date. Complete all other paperwork.					

Reported Problems (if any): ....

....

....

Action Taken: ....

....

....

....

Signed: .... Signed: ....

ORBIS SERVICE

Paxman engineers use a checklist form to ensure all aspects of maintenance are performed. The checklist is a controlled quality document and a copy is included in this pack. The following items relate to the numbers on the checklist form

Checklist item

1. Checking parameters on the controllers is not applicable to Orbis. Check setpoint on PSC by pressing the ‘set’ key.

2. Replace any cap and/or cover where there is evidence of excessive wear.

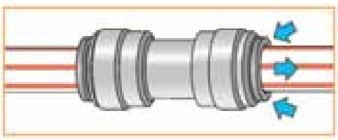
3. Check the condition of the tubing and insulation on the sleeves and caps. In particular check around the connections. Cut off worn insulation and tubing where required and refit connectors.

4. Clean the condenser. Air is drawn over the condenser and can become blocked with dust particles which will reduce the heat transfer efficiency of the condenser. Brushing and vacuuming the condenser is a suitable method.

5. The high temperature alarm check is not applicable to Orbis. Check high temperature alarm on the PSC by starting the pump with the tank temperature above 5C. An alarm should sound which can be silenced by pressing the mute/prg button.

6. The tank and caps should be ‘flushed out’ using clean water. The tank can be emptied by releasing the plug from the push fitting at the bottom of the sight glass. Fig 1 below shows how to disconnect a pipe or plug from a push fit fitting. Fig 2 shows the sight glass.

To disconnect
Push in collet and remove tube



To disconnect, ensure the system is depressurised, push the collect square against the fitting. With the collect held in this position the tube can be removed.

Fig. 1

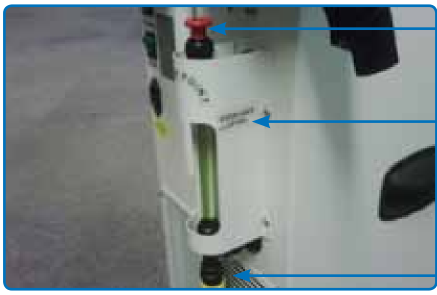


Fig. 2

The coolant can then be drained from the tank which holds approximately 2.5 litres. The caps and lines can be drained by the following method. Refit the plug at the bottom of the sight glass. Fill the tank with clean water by inserting a small funnel in the top of the sight glass or by using a jug. Fill to the indication line approximately 2.5 litres. At the back of the Orbis are the connections for the lines. See Fig 3.



Fig. 3

The red line is the coolant feed to the cap and the black line is the coolant return from the cap. Remove the black line from the push fitting and direct it into a bucket. Start the pump. New coolant will go from the tank through the red line and the cap. This will force the old coolant out of the cap and down through the black line into the bucket. Repeat this for all caps.

7. Release the plug at the bottom of the sight glass to empty the tank. A jug or funnel can be used to pour the new coolant into the top of the sight glass to the required level. See Fig 3.

8. Charging the caps with new coolant is the same as when charging with water. See section 6.

9. Turn the Orbis on and note the time it takes for the Orbis to show green arrows. This should be approximately 45 minutes for an Orbis I and 55 minutes for an Orbis II depending on ambient temperatures.

10. Clean the exterior of the Orbis.

11. Carry out electrical tests and record.

12. Sign worksheet and all other documentation.

TROUBLESHOOTING SCREEN

There is a diagnostics section in the controller which can be accessed by pressing the system button followed by the diag button and entering the code 14579. See Fig 1.

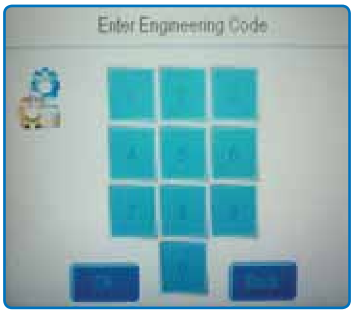


Fig. 1



Fig. 2

Press Ok and the first dioagnostic screen will appear Fig 2. Normal values for a 230v Orbis will be 1.5A compressor current, 0.25A Fan current and 0.5A treat pump 1 current. The other components are not used in the Orbis.

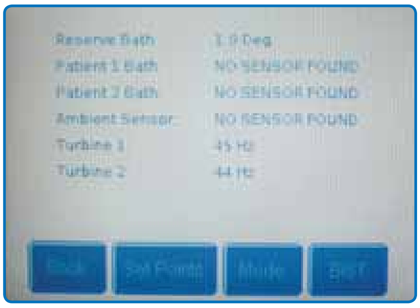


Fig. 3



Fig. 4

Touching ‘next’, fig 2, will take you to the second diagnostics screen. Here you will see the bath temperature and turbine speed. The ‘Reserve Bath’ shows the tank temperature. The Orbis set point is -5˚C. The other bath temperatures and the ambient are not used in the Orbis. The turbine shows the speed at which the coolant is flowing around the cap. The Orbis will show low flow when this value goes below 10hz. The value should always be above 10hz. If the cap is cold and there is flow but the turbine shows 0hz then the turbine may have become stuck. This can be resolved by exchanging the turbine or removing the four screws and spinning the blades.

The set point can be changed by touching the set point button fig 3 and entering the code 13579 in the code box. The screen in fig 4 will then appear. The set point should be changed at treatment set point P1. The other two set points are not used in Orbis.

The mode button fig. 3 allows the user to specify Orbis 1 or Orbis 2 and BIST is a self test. These should not be used.

Note: Current values (Amps) will be approximately double for the 110v Orbis.

TROUBLESHOOTING: ELECTRICAL CIRCUIT

The mains supply is fused as it comes into the Orbis. F1 is the positive fuse and F2 the Neutral. The supply then enters the touchscreen controller via the mains power switch. Therefore if the is a light on the mains power switch fuses 1 and 2 are OK. The touchscreen controller provides the power supply for the Pump, Compressor and Fan via fuses F3, F4 and F5 respectively.

Fault Finding

Q. The screen does not come on.

A. Check that the power switch at the back of the Orbis is switched on and that the switch lights up. If the switch doesn't light check in the following order. The socket you are using is ok by trying another appliance, The power lead is ok by trying another lead, Fuses 1 and 2 are in the Orbis are ok. If the switch does light up check the green led at the back of the controller. The green led is next to the temperature probe. If this lights up and the screen doesn't then the screen has a fault.

Q. Low flow alarm is showing.

A. Check the cap lines for any restrictions. If there are no restrictions then the coolant level may be low. Remove the top plug on the sight glass to check this as a false reading may be given with the plug in place.

Q. The coolant doesn't seem to flow fast enough.

A. This can be checked in the diagnostics screen. Press the system button then the diagnostic button. Enter the code. Press next where the screen will display the turbine speed. The turbine should read at least 15hz with the cap connected and 20hz when bypassing the cap by connecting the line connectors at the cap end directly together. Check coolant level as above if this is not the case.

Q. The screen says attach cap when the cap is attached and coolant is flowing.

A. Check the turbine speed in the diagnostics screen. (see above). If the turbine is reading 0hz and coolant if obviously flowing because the cap is cold then the turbine may be stuck. The turbine can either be replaced or repaired by taking the four screws out and opening the turbine and spinning the blades.

Q. The pump is on but the controller says start pump.

A. The controller hasn't recognised that the pump is on. The controller needs replacing.

Q. The screen is on but the pump doesn't work.

A. We know that there is power to the screen/controller so we can start from there.
The pump is powered from the controller at connector plug 5 (please see the attached drawing showing the back of the controller).

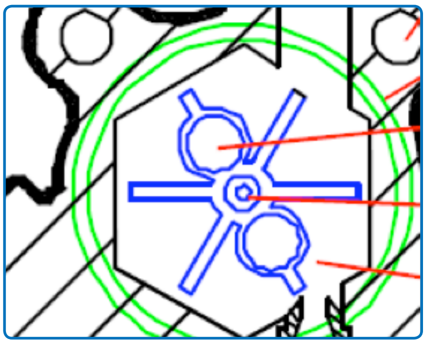
The power comes from the controller to the switch which is labelled pump at the back of the Orbis.
If this switch is on then it should light up. If it lights up we know we have power to the switch.
From there it goes to fuse 3. This is situated under the front cover. Please check this fuse.

If the pump switch light is on and the fuse 3 is OK then there should be power to the pump.

You can check this by pressing the system button on the screen, then press diag, then enter the code 14579.
You will see 'treat pump 1 current'. This should be zero if no power is getting to the pump. If it is zero then there is a problem with the power supply, change fuse and or pump switch. If it is above 0.5A then the pump is either seized or stuck and the pump should be changed.

Q. The turbines are reading 0hz.

A. The coolant system on Orbis is a sealed system. Any debris which enters the system can stop the turbine from spinning as the gap between the turbines and the housing is very small, see picture.



Do not blow into the turbine as this can cause damage to the turbine. The coolant should be removed and the system including all caps should be flushed with water before refilling with new coolant. New turbines should be fitted last of all.

Diagnostic readings quick reference:

Turbine speeds	> 15hz
Compressor current	approx. 1.5A
Pump Current	approx 0.5A
Fan Current	approx 0.25A

ELECTRICAL SCHEMATIC DIAGRAM

